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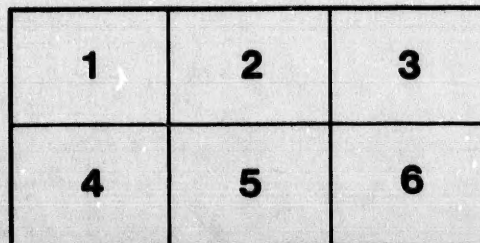
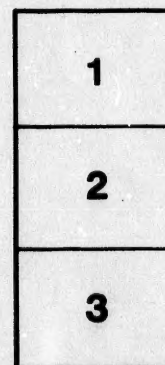
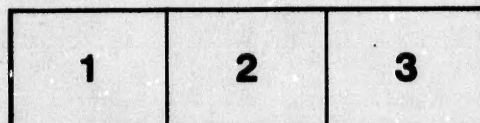
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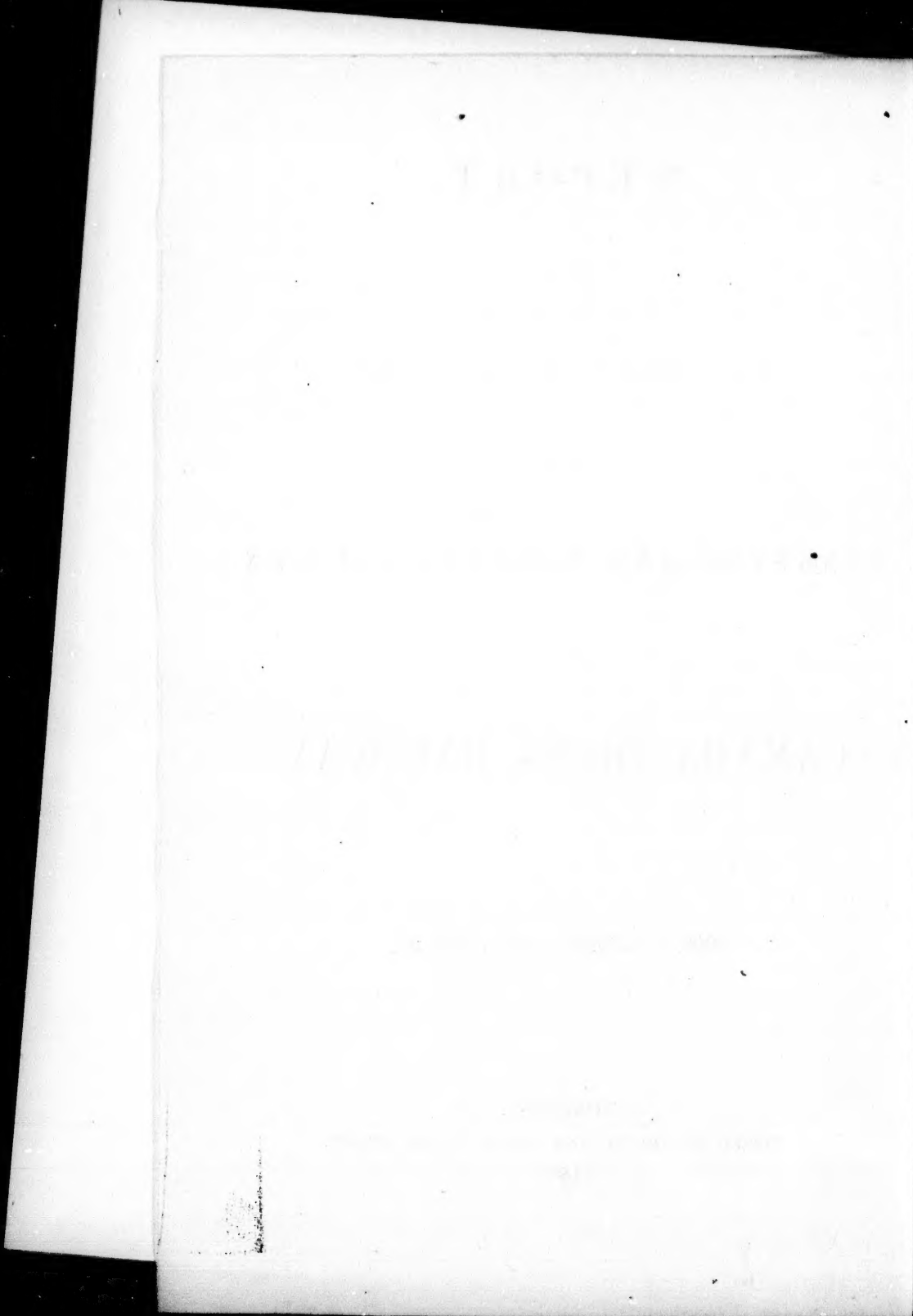
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REPORT
ON THE
PRELIMINARY SURVEY
OF THE
KINGSTON AND TORONTO SECTION
OF THE
CANADA TRUNK RAILWAY.

THOS. C. KEEFER, CHIEF ENGINEER.

TORONTO:
PRINTED BY LOVELL AND GIBSON, FRONT STREET.
1851.



R E P O R T .

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TORONTO, 25th June, 1851.

JNO. BEATTY, Esquire,  
Secretary to the Provisional Committee.  
Kingston and Toronto Railway Company.

SIR,

Having been selected in March last by the Provisional Committee, representing the Municipalities and Towns between Kingston and Toronto, to make the Preliminary Survey, Report and Estimate for this portion of the Canada Trunk Line, I have now the honor to report the completion of this survey with plan, profile and estimate of probable cost of a first class Railway.

The resolution announcing the decision of the Committee, was unaccompanied by any instructions defining the route—a virtual adoption of the best ground to be determined by the survey. Under a full appreciation of the responsibility devolved upon me by such abeyance of all local considerations, I have selected that route which the face of the country most clearly indicates—and which I believe is required by the true interest of the Municipalities in question, whether considered as independent districts, or as “federal” members of the Provincial family.

A description of the route followed is appended to this report.

## GENERAL CONSIDERATIONS.

## DISTANCE.

Inasmuch as an air-line route between Kingston and Toronto would fall in Lake Ontario, it became necessary, in projecting a Railway between these points with a view to directness of line, first to ascertain the most northerly limits of natural navigation connected with the Lake—the junction of which with the termini will give the shortest route to be obtained without interference with that navigation. In the present case these points are Napanee, Myer's Mill, (above the Trent Bridge) and "Frenchman's Bay," in Pickering. From Kingston to Newcastle, (near Bond Head Harbour) and from Toronto to the Rouge, the direct line affords at the same time the best ground for a Railway. Between Newcastle and the Rouge, a distance of about 30 miles by the present road, a direct course becomes very disadvantageous, and to obtain better ground an elongation of about six miles is required.

A careful comparative survey when the work is taken up, will decide whether any attempt should be made to cut off this detour. On the direct route there would be less distance and less formidable bridging—but the cost of grading would be much greater; and the line far inferior with respect to grades and maintenance.

The actual length of the surveyed line exceeds the shortest possible route avoiding the Lake about nine miles, in a total length of one hundred and sixty-five miles.

I have first referred to this question of distance, because it must be evident that, irrespective of the first cost of an unnecessary mile, the future maintenance of the same, together with the loss of time and waste of power incurred by the whole subsequent traffic throughout the life of the road, admonish us that no addition should be made to the distance without substantial reasons. It fortunately happens upon this route, that there are no local considerations of such magnitude as to claim a diversion of the onward course of

a great Provincial Highway (as a part of which this section derives so large a share of its importance), because the line *necessarily* passes sufficiently near the towns and villages between Port Hope and Kingston, to command all the support which they can give it:—and although economy and the efficiency of the route compel us to pass a little northward of the thriving villages between Port Hope and the Rouge, it is not at all probable that the interests of the road will suffer any by this unavoidable location.

There has been a suggestion that the Railroad should be laid back from the lake for the purpose of "opening up" the country.

Traffic will seek its level and concentrate upon those lines which in their character approximate most closely to water communications. Without deciding what "back route" would open up the country, it is only necessary to refer, (in the present case) to the obstacles presented by the lakes and hills which approach so closely to Ontario. If the line were placed northward of Rice and Scugog lakes, it must forego the traffic south of these waters, which it cannot afford to do; and if it be a question of location confined to the belt between these smaller lakes and Ontario, no one would advocate a removal from the best ground for any additional facilities which so narrow a range could offer to a particular locality,—at the expense of the whole traffic east and west of that locality. A river drains a country because it occupies the lowest ground therein, and the surface water *descends* to it by an invisible power. A main drain for a farm is governed wholly by the ground—and the lesser ones are led into it from particular points. And thus, as far as practicable, the Trunk line we are now considering should be placed where its numerous feeders may approach it to the best advantage. It is as impossible for the Trunk line to accommodate *directly* all local interests as for the main street of a town to become a substitute for all others.

Rice Lake is 365 feet, and Scugog Lake 575 feet above the level of Lake Ontario. The dividing ridge has an eleva



tion several hundred feet higher and is distant from 8 to 10 miles from the shores of the latter, giving an *average* grade of about 70 or 80 feet per mile to the Southern slope. The streams emptying in Ontario have an average fall of about 50 feet per mile. These conditions indicate a state of things favorable to the future interests of the road and the economical traffic of the Counties. Produce coming to the road has generally a descending route in the direction of the heavier load—and the distance is one which makes plank or gravelled roads (except at one or two points) preferable to Branch Railways. Wherever a Railway is located, and however numerous its branches may be, the team of the farmer is always required, if only for the purpose of collection, and where but a short distance intervenes the waggon road will frequently be preferred—because it is open to all, and all are provided with the means of travelling it.

Some fears have also been entertained of unfavorable influences to be exerted by a Railroad upon the towns and villages near which it may pass. It is supposed that wherever the road is located the general business of the town will concentrate to the detriment of existing interests—and unnecessary anxiety is evinced about the particular street through which it will pass. There is no more reason for this belief than for considering the wharf or shipping port of any town as the whole, or the most valuable part of that town. The Railroad Depot for any town is an inland wharf and all fears of its prejudicial influence upon other established interests will be dispelled by a little experience.

Again, an over anxiety is shown to bring it *into* existing towns and villages which it may pass by, within a mile or less. This is unreasonable,—for if the future prospects of the villages or towns warrant such a demand upon the road, we must look forward to the time when the extension of these, respectively, into towns and cities, will bring them upon, or sufficiently near, the Railway; and if they have not these prospects—they should claim no influence over the location.



It is neither the object nor interest of Railways to draw around their depots the multifarious pursuits which employ a town: neither will every farmer become his own forwarder, and deal directly with the road. The Mill, the Post office, the workshops and stores will still be the centre of local business, where country produce will be collected and transferred to the rail—for to these points the existing roads will bring it. It is true that where the road passes much to the rear of villages which have been formed without sufficient local advantages to ensure their pre-eminence,—new places of business will divide with them that portion of the trade which takes the rail: but, in every case, it is believed that the Railway will give a positive impulse to *all* existing towns: and should it change the comparative position of any, it will only hasten what would otherwise have been inevitable.

#### GRADES.

The next question to be alluded to, is the "Grades" or character of the route with respect to levelness of surface. It is of course desirable to have every road brought as near a level as a due regard to economy will permit. In the present case, where the general outline of the natural surface is so favourable, and the points where obstacles to easy grades present themselves are few and slight,—the "ruling gradients," or maximum rise or fall per mile, being established by the general features of the route, all minor points should be reduced to this standard, provided the cost be not disproportioned to the object to be gained.

The ultimate policy on this head will no doubt be influenced by the results of the survey of the Kingston and Montreal section of the Trunk line: because, the greater portion of that line being a *descending* route, if a more favorable grade "going east" should be there found, some additional exertion would be warranted in reducing the eastern rise upon the Toronto and Kingston section, in order that an equal load could be drawn throughout. As the movement of freight eastward is usually more than double the weight of that

going west, it is important to reduce the rise opposing a train going east to a minimum,—without particular reference to the grade which a returning train may have to contend with.

This question of grades is the more important because public opinion has almost “travelled the circle” in reference to it. In the early English roads immense sums were expended in reducing the *natural* grade of the route, upon the mistaken supposition that the engines would always have a maximum load. Experience has shown the folly of this expectation, to which there are both commercial and mechanical objections—commercial, because public accommodation requires *frequent fast trains* starting at stated periods—the oftener the better—whether a full load be ready or not;—mechanical, because long trains require heavy engines, heavy rails and bridges, and heavy “Repairs;” and because, in trains of great length, the whole draught is, at intervals, thrown upon a single carriage, every one of which must therefore be made with greater expense and a greater proportion of dead weight. Atmospheric resistance, “binding” upon curves, and uncontrollable momentum are additional objections to very weighty trains.

Finding the immense sums which were expended in reducing the grade productive of no proportional result, the other extreme was taken up. In many mountainous districts in America, where the natural grades range from 60 to 100 feet per mile,—it became a question between a Railway with heavy grades, and no Railway at all: and because such Railways exist, it has been supposed that the same objection, which applies to every ascent upon a common road, does not obtain upon Railways.

As the draught of an engine (of sufficient boiler power) is in proportion to the weight upon the driving wheels,—and since this draught is rapidly diminished upon ascending gradients—in order to work the steep grades engines of a heavier build were brought out from year to year, until the first specification of six tons has been increased to above thirty. These “monster engines” call for a heavier

and better rail, stronger bridges, and more substantial road bed. But it is found that both the weight and quality of the rail are limited by the difficulty of securing good manufacture, after a certain size is reached ; and, as a necessary consequence, that of engines must be limited or reduced ; and where high grades are unavoidable, lighter loads must be taken, or a more substantial and expensive road be made.

The conclusion to be arrived at is, that although it would be unwise to incur great expense in reducing gradients (because the proportion of the working expenses which are affected by these, is upon most lines small compared with the charge involved by interest on capital so sunk), yet a route which will admit of easy gradients, may be worked with a lighter rail and lighter locomotives, less injury to the rolling stock and the rail, (from the frequent application of "brakes," so indispensable on roads with heavy grades), and may be run at greater speed with reduced risks, and be, in the true sense of the word, more economical.

A table of the performance of Locomotives of different weights and upon different grades is annexed, which will explain this subject. (See Appendix A.)

#### CURVATURE.

As the location is very much governed by the curves, and next to grades, the cost of the road bed is influenced more by this question than any other—it demands here a slight explanation.

The necessity for curves in Railways has been the mother of the invention of the peculiar wheel (or roller rather) every where in use. If the road were straight, the tyres of the wheels would be similar to those of an ordinary carriage ; but, on account of the curves, these tyres are conical, making the diameter of the wheel greater at the inner than at the outer edge. The wheels do not revolve on their axles, neither is there any contrivance like "shafts"

or "tongue" and the "king-bolt" of an ordinary wagon to effect a change in the direction ; on the contrary, the wheels are firmly keyed on to their axles, which revolve with them, and the two axles and four wheels of any Railway truck are always parallel. On meeting a curve, therefore, there is a tendency to move onward in a straight line, which forces the *outer* wheel on its larger diameter, while it draws the inside one down upon its lesser diameter, thereby causing the outer wheels to move faster than the inner ones, and in this manner the direction is changed. This explanation will show how sharp curves must check the speed of a train—causing grinding and slipping of the wheels on the rail—wrenching of the axles, and injury to the whole carriage from the lurching on the springs caused by this side motion ; at the same time reducing the power of an engine (particularly in long trains) from the frequent change of direction in the draught. Straight lines are therefore much prized and much is sacrificed for them.

By adopting frequent and sharp curves, and avoiding slight obstacles, a road can be constructed at a much less cost per mile, than if carried over and through these lesser obstacles for the purpose of preserving straightness of direction, or of obtaining easy curves : so by adopting an arbitrary grade, as necessary to the success of a particular route, and bringing the surface to that grade, a greater expense must be incurred than if the natural undulations of the ground be followed within the limits of the power of an engine. I have thought it proper to lay before you these cardinal principles of a Railway estimate, and to explain that I have not felt it my duty to select or estimate for the *cheapest* line, but that one which, in my judgment, the very advantageous character of your route generally, the wants of your counties, and the requirements of a Provincial highway both warrant and demand.

## CHARACTERISTICS OF THE ROAD.

## DISTANCE.

The measured length of the line as levelled is one hundred and sixty-five miles, including the approaches to the Lake; the distance between the limits of the two cities is about one hundred and sixty miles.

## GRADIENTS.

The maximum grade rising east, will be 30 feet to the mile. Ditto ditto west, 40 feet to the mile.

TABLE OF GRADES.

| Level and under<br>10 feet to the mile. | Ascending East.                 |                                 |                                 | Ascending West.                 |                                 |                                 | Total. |
|-----------------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|--------|
|                                         | From 10 to 20 feet<br>per mile. | From 20 to 25 feet<br>per mile. | From 25 to 30 feet<br>per mile. | From 10 to 20 feet<br>per mile. | From 20 to 30 feet<br>per mile. | From 30 to 40 feet<br>per mile. |        |
| 66½                                     | 16                              | 6½                              | 26½                             | 19                              | 11½                             | 19½                             | 165    |

## ABSTRACT.

|                                      |             |       |              |
|--------------------------------------|-------------|-------|--------------|
| Level and under 20 feet to the mile, | 101½ miles, | ..... | } 165 miles. |
| From 20 to 30                        | "           | 44 "  |              |
| " 30 to 40                           | "           | 19½ " |              |

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CURVATURE.

The number of miles of straight line will be about one hundred and thirty-two, and of curved thirty-three.

The radius of the smallest curve will not be less than one mile.

The greatest elevation attained is in the township of Scarborough and is three hundred and thirteen feet above the level of Lake Ontario.

The passenger depots at Toronto and Kingston will be upon the same level, seventy-two feet above the Lake.

Of the 165 miles levelled—100 miles are through cleared lands, and 65 miles through woodland. These proportions will be varied by the Location Survey, but may be taken as a fair index of the line.

The extent of soft swamp on the whole line is three miles.

The whole line passes through a rich and highly cultivated country; it generally runs upon soil less valuable for agricultural purposes than the average in the counties, although the best for a road bed; and its position and direction are such as to do a minimum amount of injury to private property—both in the townships and in the towns. The soil is so generally favorable, that only about sixty miles out of the whole distance will require ballasting—a consideration of importance, since on clay formation, this is an item involving an expense of £250 to £300 per mile. Timber of all kinds required in the construction, is abundant and cheap along the route, and stone can be delivered from Kingston opposite every point of the road where it is not found. With respect to grades—soil—facilities for obtaining supplies and materials, the line is a highly favorable one; and were it not for the amount of high bridging required, the average cost per mile would be far below that of ordinary roads. In the location survey careful and minute examination should be made, in order to as-

certain if less expensive and equally efficient crossings may not be obtained ; and an improvement (if practicable) of the more circuitous portions of the line. This would have involved the expenditure of time and money, which I did not consider justifiable in a preliminary survey.

The object sought for by this survey has been gained by establishing the fact that a Railroad is practicable,—can have favorable grades and curves, and be built at a moderate cost.

THE ESTIMATE.

Having already explained the causes which influence the estimate for a Railway, I only propose to allude to three items in which a great range is unavoidable.

1st, The cost of land will depend much upon legislation, and more upon good management.

2nd, The "Rolling Stock," or furniture of the road may be increased so as to raise very much the *per mile* cost. I have provided for an amount sufficient to work the ordinary business of such a road :—should a large "through" business call for increased furniture, it can be afforded, and may be charged to Transportation Account. Likewise the cost and extent of engine-houses, stations, machinery, and machine shops, will vary with the business of the road, and the character of the buildings—whether of wood, stone, or brick. They should be *fire-proof*.

Lastly, Interest of loans, and discount on the sale of bonds or stock—as well as interest upon the Capital paid in until dividends are declared—are legitimate items of a Railway estimate, and form part of the *per mile* cost. The financial arrangements in the present case not being defined, I would only suggest, that to the estimated cost of the road and furniture, as made by the engineer, the probable amount to be paid for the use of money wherewith to obtain these, should be added ; and thus avoid important discrepancy between the estimate and the cost of such works,—the amount of which cannot be foreseen by the Engineer.

The class of road contemplated by the estimate embraces the T rail, weighing sixty pounds to the yard. This weight, we have the authority of Mr. Brunel for saying, is more durable than one of eighty five pounds to the yard, in consequence of the difficulty of properly manufacturing the larger rail. It will be secured to cross ties of tamarack or cedar, the whole resting on a permeable road bed, made so by free sand or gravel wherever required.

Bridge abutments and piers to be made of substantial stone masonry, upon which will be laid a wooden truss (with fire-proof roof), built upon the combination of the arc and truss, known as the "Burr," or "Pennsylvanian" method,—the track in all cases to be placed upon the top of the truss.

The average quantity of land to be taken to be about twelve acres per mile. The cuttings to be as shallow as possible, and to be widened as far as required, to obtain material for filling; the grade to be kept generally above the surface of the ground, in order to secure drainage and avoid the snow. In rocky sections, where earth is scarce, and through low and wet swamp, trestle work and piling to be at first employed, afterwards to be filled in by the gravel train.

The Iron should be made under a contract, specification, and the supervision of a competent inspector; for there is a difference in its quality and manufacture, as well as in cotton or woollen goods. Much of the railway iron turned out, is manufactured after the manner of most cigars,—outside a smooth wrapper, and miserable stuffing within.

The carpentry, iron-work, and foundations of the bridges, should be executed by the Company; the delivery of materials, and all the remainder of the work, may be done by contract.

**APPROXIMATE ESTIMATE of the average cost per mile of a
Single Track Railway between Toronto and Kingston.**

Land, including Fencing and Road Crossings, Cattle Guards and Passes, &c.	£ 300	0	0
Grubbing and Clearing (where required,) Total cost £9,900; average per mile of whole distance	£ 60	0	0
Graduation, Masonry, Bridging and Culverts,	£1,900	0	0
Ballasting (on 60 miles only,) Total £16,500; average per mile of whole distance	£ 100	0	0
Superstructure, including Iron, Ties, Fastenings and Laying Track	£1,250	0	0
Wood and Water Stations, Sidings and Way Stations..	£ 90	0	0
Furniture—including Locomotives, Cars, Terminus Buildings, Machinery and Shops	£ 600	0	0
Engineering	£ 125	0	0
Average cost per mile.....	£4,425	0	0
Total cost of 165 miles at £4,425 per mile, £730,125, (Seven hundred and thirty thousand, one hundred and twenty-five Pounds.)			

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**POSITION AND PROSPECTS OF THE ROAD.**

The proposed line is intended to connect the cities of Toronto and Kingston—passes for 160 miles through a fertile and well settled country, and touches the important towns of Napanee, Belleville, Cobourg, and Port Hope.—The population of the Counties connected with the road is as follows:

|                                      | 1841.          | 1850.          |
|--------------------------------------|----------------|----------------|
| Frontenac, Lennox and Addington..... | 32,208         | 40,670         |
| Hastings.....                        | 13,161         | 23,454         |
| Northumberland and Durham.....       | 41,951         | 50,017         |
| Peterboro . . . . .                  | ... 13,706     | 22,062         |
| Prince Edward .....                  | ... 14,661     | 18,258         |
| York.....                            | ... 67,074     | 113,007        |
| Simcoe.....                          | ... 11,576     | 25,753         |
|                                      | <hr/>          | <hr/>          |
| <b>Total</b>                         | <b>194,337</b> | <b>293,221</b> |

A table of exports from the Lake ports of these counties is given, showing the articles which may be drawn out by a Railway. (See Appendix B.)

This line is also one of the main sections of the "Canada Trunk Railway" which will shortly unite the "Great Western," and its connections (leading westward to the Mississippi,) with the several railways radiating from Montreal—to Portland and Halifax, Boston and New York, and to the future Seat of Government, Quebec.

It is therefore to be considered first in its *local* position, as a route connecting Toronto and Kingston—and accommodating the local traffic from point to point in the counties; and secondly its position as a part of the Trunk line.

In both characters we must examine separately its winter and summer operation—its freight and passenger business.

The competition of the Lake is foremost; but as respects passenger travel, this competition need not be feared. Few persons will go upon the Lake when they can get from Toronto to Kingston in five hours, at the same price as is now charged by the steamers for cabin fare; and those who live at intermediate points have too lively a recollection of the uncertainty either of getting aboard or ashore whenever there is sufficient wind to cause the steamers to "stand off," and carry their miserable prisoners past their homes. There is a broad difference to passengers between Lake and River navigation. River steamers do not require to be sea boats, and can therefore be built lighter, attain greater speed, and afford better accommodations, while their route is exempt from the horrors of "sea-sickness." Moreover they are *regular* and can always make their landings, being but little affected by storms. As a proof of the power of Railroads to compete with water communications, we may refer to the shore roads along Long Island Sound.

For general freight going through, the Lake has decided advantages—but light and perishable or valuable goods (upon which the freight would be a trifling proportion of the value) will take the rail to save the insurance or risk.

We must also expect a concentration of business at the more favored points—the best markets—or the best harbours—and to reach these the Railway will be employed.

The distinctive features of the Lake and River navigation will likewise give much local employment to the Railway. From the head of the Bay of Quinté a barge may proceed without transshipment to Montreal or Quebec,—to Lake Champlain and New York. A variety of steamers and other craft not suited to Lake navigation, and of cheaper construction and management, can be called into requisition when this Bay is reached; and large quantities of local and through freight may be expected to follow the road to the Trent and Belleville, whenever the demand is brisk and the season far advanced. Lake Scugog, which has a steamer now plying upon it, is connected with a great extent of inland navigation—a barrel of flour can be taken by Railway from this Lake to the Bay of Quinté or Kingston cheaper than it can be teamed down to Windsor Harbour.

But the most important local business of the road will be that which it will create by bringing into the market the extensive water power distributed along this route. The principal streams emptying into Lake Ontario have a fall of several hundred feet within a few miles of their mouths. Situated in one of the healthiest and most fertile parts of the Province,—the nearest to the sea-board of the wheat districts of Canada West,—upon the immediate line of the cheapest water communication in America, and by it connected with the busy millions in the "Great West,"—the whole northern shore of Lake Ontario offers facilities for manufacturing unsurpassed by any other locality. The raw materials may be delivered by water—in which case they will be held by capitalists in the principal towns. The manufacturer will order his raw material as he needs it, and send in his goods as fast as manufactured. This cannot be done without a Railway—because from the close of navigation to its re-opening, heavy capital would be required to lay in the supply of raw material, manufacture it and keep it on

hand until an outlet was found in the spring. In a new country such an amount of capital could not be so partially employed, and if it were, it could not compete with better management. With a Railway the manufacturer with small capital may buy and sell weekly throughout the year.

#### WINTER BUSINESS.

##### *Passengers.*

From the first of December to the first of April—four months at least—the Railway will have no competition on the Lake. During this period the communication between Toronto and Montreal is chiefly made *via* Albany and Buffalo! It is impossible to form an estimate of the amount of travel which would take the north shore of Lake Ontario, in the winter, from any returns of present travel in that season;—first, because no one but an able bodied man can endure the fatigue, and even such would not undertake the journey but upon compulsion:—and secondly, because we have no account of the number who betake themselves to the American Railways to reach Montreal or Boston.

##### *Freight.*

The local freighting business which would be done on this line in winter will be wholly of a new character—created by the road. The Atlantic cities and those in the interior of New England—on the Hudson—and on the Erie Canal—are rapidly filling up with a commercial and manufacturing people. The inferior products of agriculture required for the consumption of these crowded cities far exceeds the supply from their immediate neighborhood—and although Railways have been pushed up in almost every inhabited valley in New England—these busy foragers are unable to supply the demand. Since the Ogdensburg Road has been opened, an important increase has been experienced in the price of live stock of all kinds, fresh pork and beef, coarse grain, potatoes, butter, eggs, poultry, &c.,

from Glengary to Brockville. To the farmer this is decidedly the most important benefit conferred by the Road. Instead of the local consumption of our villages,—with the Railway they would become suppliers of Boston and New York hotels, at prices so much advanced as to bring out freely the surplus of the most distant Townships. When articles hitherto considered valueless will find an unlimited cash market,—and when the staple articles are advanced in price, the value of the land is immediately enhanced—and I do not doubt that when this Road is built, with efficient connections, the value of real property in these counties will be at once increased by more than the amount of the whole cost of the road.

I cannot do better here than introduce an extract from a recent number of the "Railway Times," the most ably conducted of the American Railway Journals.

"When the railway enterprise of Massachusetts was in its infancy, it was opposed, not only by farmers owning land on the line of the proposed routes, but by the inhabitants of neighboring cities who supposed that railway communication with the metropolis would be fatal to their business, and gradually absorb and centralize the whole local trading interest. The pioneers of the early railways had no greater obstacle in their way than this opposition, and a great deal of money, time and effort, was expended to prevent the construction of railways to the different towns and cities near the capital of this State. What has been the result? Why, wherever the railway has been built, real estate has advanced from *twenty-five to one thousand per cent.* during the last ten years; population has increased, local business has increased, and the general business enterprise of the country has advanced very materially. Where the railway has *not* been constructed, another state of things exists. We find a gradual decline in business, because the more enterprising part of the population were determined to go where they could have easy facilities for reaching a market, and

“therefore grouped themselves along-side of the railway track, in small settlements which have gradually become villages and cities even. Where there are no railways the population has not increased, as a general rule, but on the contrary it has decreased, from the cause noticed above; real estate has depreciated in market value, and there is everywhere noticed a general stagnation in business enterprise. This has been the invariable effect, whenever from poverty or from the opposition we have noticed, railways have not been constructed in the New England States. Where they have been built the farmer has reaped the benefit in no niggardly degree. His farm has increased in market value; his produce finds a ready market at greatly advanced values. Easy communication with the cities, the foci of wealth, intelligence and enterprise, has enlightened and elevated his mind, as well as filled his pockets. These and other manifold benefits are no mere matters of speculation; they are facts which the New England farmer is willing and does bear witness to every day, in spite of his early and mistaken prepossessions against the railway.

“Some eleven years since, a person was forced, very unwillingly, to take a farm within some ten miles of this city (Boston), in payment of a debt of some \$12,000. It was,—take that or nothing; and he did take it, although he thought himself a loser of fifty per cent. of the debt by the transaction. A line of Railway was chartered to run through it, and he vehemently opposed the project on the ground that it would ruin the property; and he believed it too. The Railway was built in spite of his opposition, and now mark the result. Of that same property he has sold enough to net him a round hundred thousand dollars, besides having a very handsome and valuable estate left. His mind has changed somewhat as to the value of Railways.

“We copy from the New York Wool Grower:—Our products are valuable in proportion to the cheapest and best facilities whereby they may be transported to market



"The great consumers of the Agricultural products of this  
 "State, are New York City and the New England States;  
 "and for nearly half the year we have no means of reaching  
 "them except by Railroad. It has only been about three  
 "years since the absurd restrictions which had been placed  
 "upon the Central line have been removed, so that freight  
 "could be carried. Previous to that time our fresh pork,  
 "poultry and butter, were sold at a low figure, because we  
 "were out of those markets where these articles are in  
 "demand during the winter for daily consumption. The  
 "average ruling price for butter was ten cents, fresh pork  
 "three dollars per hundred, and poultry no demand at all.  
 "But as soon as the roads were allowed to carry freight, and  
 "long before they were prepared for the business, an advance  
 "took place in all of these articles, which has been steadily  
 "maintained. The rise upon fresh pork has been equal to  
 "\$2.50 on each hog fattened for market, upon butter ten  
 "cents per pound, and upon eggs, poultry, beef, mutton and  
 "cheese, it has been equally large. Of this advance of  
 "price there can be no doubt, and it is equally certain that  
 "it has been caused by the facilities of transportation fur-  
 "nished by Railroads in this State and east.

"Let us see now what the farmers have really gained by  
 "these roads. According to the State Census of 1840, the  
 "whole number of hogs was 1,594,344.

"Allow for stores one third, and the number  
 fattened would be about..... 1,000,000

"Deduct for home consumption, say one third,  
 "or..... 300,000

"Leaving for market that year..... 700,000

"The natural increase would be large, but increased  
 "price would stimulate production, so that it is safe to  
 "assume that the number of hogs in this State to be fattened  
 "for market this year will exceed 1,000,000, two thirds of  
 "which will be so situated as to be affected in price by one  
 "or the other of our Railroads. This would give, say 700,-  
 "000, which, allowing an advance from the former rates of

"only two dollars per hog, would give \$1,400,000 for only  
"one branch.

|                                             |            |
|---------------------------------------------|------------|
| "Of butter, there was made during the year  | lbs.       |
| "1835.....                                  | 79,501,733 |
| "Deduct for home consumption one-third, say | 26,000,000 |

|                               |            |
|-------------------------------|------------|
| "Balance for market, say..... | 53,000,000 |
|-------------------------------|------------|

"At least two-thirds of this, say 36,000,000 lbs. experience a rise from the beneficial operations of the road.  
"The advance upon this was equal to two cents per pound, say \$720,000, making a clear gain per annum to the farmers of this State of over two millions of dollars in but two articles of farm produce. Upon other articles there has been a large gain, so that it is safe to say that for the current year the farmers will be benefited by means of Railroads as a means of transportation of farm products, at least three millions of dollars. The sum, at first sight, seems large; but we are persuaded it falls below, rather than exceeds the true amount.

"But the benefit does not stop here; for a very great stimulant is given to Agricultural improvement, and land is made to yield much larger and better crops; so that, in fact, our farms are practically enlarged, not by adding more acres, but by adding more labor and skill to the soil. By careful husbandry we may treble the average products of most if not all of our crops, and not arrive at any thing like the full capacity of our farms. And is it not better to add to our land by better thrift in farming, than to sell out and be constantly seeking new and cheap lands?"

Take the transport of live stock as an instance (for which Railways are admirably adapted, inasmuch as the freight transships itself when required), it is well known that cattle must be fed for weeks, while on their way to market; and that in addition to this expense, they suffer in value by the journey. During the season of navigation, your counties have the Montreal and Quebec markets, but with the Railway they would, in addition, have those of New York

and Boston *throughout the year*. The following extract from a late English paper is a condensed essay on this subject :

"No less than 1300 head of fat cattle were sent from Perthshire (Scotland) to the London market, during the week ending March 21st, by a single Railway train. They are valued at £20,000, and reached their destination in twenty-four hours, while the drove system would have taken six weeks."

While the advantage of a winter market, for the inferior products of agriculture, the facilities of travel, and the creation of manufactures, (both winter and summer) would, of themselves, be sufficient to demand this road—there can be no question that a very large freighting business in our *staple* articles of export will be done upon it throughout the winter. The amount of surplus produce held over in winter is always greater than that which is shipped between the gathering of the harvest and the close of the navigation. All the grain, flour, pork, &c., which is now crowding through the Welland and Erie Canals, and shipping from all our lake ports, must have been the produce of 1850, or previous years. The following statement, taken from the monthly returns of the Welland Canal for 1849, will give a fair illustration of the amount of surplus produce which remains over during the winter.

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Shipments through Welland Canal, entered at Port Maitland  
in 1849.

|                 | Wheat.<br>Bushels. | Corn.<br>Bushels. | Pork.<br>Barrels. | Flour.<br>Barrels. | Remarks.                                                              |
|-----------------|--------------------|-------------------|-------------------|--------------------|-----------------------------------------------------------------------|
| April. ....     | 179,958            | 12,765            | 10,461            | 22,520             | These amounts<br>must have<br>been held<br>over during<br>the winter. |
| May.....        | 413,778            | 18,274            | 40,203½           | 43,786             |                                                                       |
| June .....      | 646,774            | 130,348           | 6,196             | 29,030             |                                                                       |
| July.....       | 454,079            | 141,434           | 2,315             | 29,306             |                                                                       |
| Total.....      | 1,694,589          | 302,821           | 59,175½           | 124,644            |                                                                       |
| August .....    | 48,826             | 34,904            | 813               | 3,706              | May have all<br>been the<br>produce of<br>harvest of<br>that year.    |
| September ..... | 418,780            | 45,137            | 1,905             | 13,079             |                                                                       |
| October.....    | 517,943            | 29,535            | 959½              | 18,199             |                                                                       |
| Nov. and Dec... | 523,252            | 26,708            | 768½              | 17,118             |                                                                       |
| Total.....      | 1,508,801          | 136,304           | 4,446             | 52,102             |                                                                       |

This assumes that none of the produce which went through after 1st August, was of the produce of the previous year; which is very improbable. From the best information I have been able to obtain upon this point, I believe that only about one-third of our exports are made in the year of their growth and manufacture, and that about two-thirds are "wintered over."

Having seen that the freight is here during the winter, the question is, In what proportion will it take the rail? Suppose it costs 4s. 6d. to take a barrel of flour from these counties by railway to one of the Atlantic ports, or 2s. more than by water communication in summer; this sum would hardly be sufficient after deducting the interest and insurance to retain the flour. But prices rule higher on the sea-

board during the period when the supplies by water from the west are cut off; and there is very little doubt that the farmer would receive as good prices for his products in winter as if he waited until nature draws her bolts and lets the flood of western produce in to bring down prices. The advantage possessed by the farmers of these counties is, that whereas the cost of even railway transportation, from the remoter agricultural districts of the west, will shut up their products until the opening of navigation—*they*, by their fortunate proximity, may command the markets of the east at all seasons of the year.

Lower Canada is a customer to the Upper Province of about 300,000 barrels of flour annually, for local consumption. After the close of the navigation, prices there are independent of those in Canada West. Montreal in less than six months will be connected with Boston and New York by a continuous railway from the south shore of the St. Lawrence—and the slightest advance in the Atlantic cities—whether for local demand or for exportation, will draw out her stored supplies received by the St. Lawrence. The home price then rises, and flour must be brought back by the same route at advanced prices for home consumption. Upon this movement Upper Canada must helplessly look on.

We need have no patriotic fears for our canals under this supposed action:—the impulse given to the whole country by the railway will increase the legitimate business of the canals; and if the latter get fair play, the business west of your road will be enough for them.

Hitherto we have viewed the operation of the road with respect to local business only; and without asserting that this would be sufficient (exclusive of through freight and travel,) to bring immediate dividends to the Stockholders, I think that in the broader sense of the term the road would amply re-pay its cost. We pave and light our streets—tin and paint our houses, and put springs to our waggons because we are satisfied this is true economy. The railway is

to the country at large what the paved street is to the town—a necessary.

We now propose to consider this road as part of the Canada Trunk-line,—well assured that the day of its completion will see it connected with Montreal and Detroit—and through them with the Atlantic and the Mississippi.

From Detroit westward a continuous railway to the Mississippi is rapidly approaching completion. Ohio—a purely agricultural state, which, at the beginning of this century, had about equal population with Upper Canada, has laid out and chartered no less than 1,700 miles of railway, of which 672 are completed and 746 under contract. Railroads are undertaken in fifty out of the eighty-seven counties of that State. Along the south shore from Buffalo to Detroit, a railroad is in course of construction to compete with Lake Erie (which is closed a shorter time than ours)—with the Ohio, and with a central line of railway which connects Cleveland with Philadelphia through Pittsburgh. A lake shore road is not there considered absurd, although it has more than one competitor for “through” business.

From Montreal a railway will shortly be completed connecting with Boston and New York by the *east* side of Lake Champlain—another is projected to Plattsburgh and will probably be extended on the *west* side of that lake, at no distant day, to meet the Whitehall railroad which connects with all the New York and New England roads. A third road is likewise projected by the route of the Missisquoi valley, connecting with Burlington—with the Passumpsic, and with all the principal roads in New England. Lastly, the Montreal and Portland road is progressing rapidly, and east of Portland to the centre of Maine two rival guages are running a race for the Lower Colonies. When the commanding position of Halifax, as a point of departure for passengers crossing the Atlantic is considered, none can doubt the early completion of the European and North American Railway. The works of the Great Western Railway from Hamilton are pressing forward—and there remains but the connection

between Montreal and this road to give assurance of an unbroken chain extending from Halifax to the Mississippi—nearly 2,000 miles in length. Lastly the British Government, aroused to the importance of this subject, have proposed to guarantee a loan of £7,000,000 sterling, to ensure the connection between Halifax and Montreal through British territory. That the Imperial Government should offer to loan the three Colonies £7,000,000 sterling, upon any conditions or for any purpose whatever, is a fact which deserves attention; it displays either a great confidence in the route, or in our ability to undertake such a vast work. That the Canada route will receive a large share of the “through” passenger travel over this great line there can be little doubt. First, because it will be the shortest,—and secondly, because the majority of “through” travellers prefer a different route, either going or returning.

The Kingston and Toronto section of this line has an advantage over the other portions of the route, arising chiefly from physical and geographical considerations. The country west of Ontario being a broad plain, will ere long have more than one route connecting Detroit river and Lake Huron with Hamilton and Toronto. East of Kingston already rival routes are proposed to reach Montreal, and no doubt both will be built before any proposition will be seriously entertained, of constructing a rival to the “Kingston and Toronto” Road. The first road which will be laid north of this route, will be placed in the valley of the Ottawa. Three roads will probably radiate northward and westward from Toronto, and two from Kingston to the east, the “through” business of which will be concentrated upon your line.

A statement of the progress of our export of Agricultural products to the United States is annexed, showing the articles which already find a market there—their amount and value—which foreshadows much of the future business of our Railways. (See Appendix C.)



To illustrate the connections of your road, and the position of our trunk line generally, I have had prepared a map, extending from Detroit through Montreal to Melbourne, the junction of the Quebec and Portland roads. This map is upon a scale of two miles to the inch, and shows all the principal highways of Canada West. Such a work would have been out of the question, as regards both cost and time, had it been original. It contains the labor of years devoted by Major Baron de Rottenburg, A. Q. M. Gen., for the purpose of showing the travelled roads of the country—who most generously permitted it to be copied—an operation made comparatively easy by the recent valuable invention (in England) of a transparent cloth by means of which detached maps on a uniform scale can be traced, to any length, continuously, with great expedition and economy.

I have to acknowledge the valuable exertions of my assistants. Messrs. T. S. Rubidge, J. H. Dumble, Jno. C. Innes, and J. O. Browne, who have exerted themselves to accomplish the survey within the shortest limits, both of time and expense.

I have the honor to be

Sir,

Your Obedient Servant,

THOS. C. KEEFER,

*Chief Engineer.*

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A P P E N D I X .

DESCRIPTION OF THE LINE.

FROM Kingston to Napanee the line traverses a limestone formation separated by streams (having a flow uniformly to the southwest) into a series of broad flat-topped ridges. Nearly the whole formation is solid limestone, with a light covering of earth lying upon it; in many places the rock is exposed. These streams have not a great volume,—but from the width of their valleys and the rocky character of their upper banks the crossings at three points, Cataragui, Powley's Creek, and Napanee, must be elevated, and will be expensive. The intermediate portions of the line (between the streams) present the smooth surface characteristic of limestone formations and afford favorable grades. The scarcity of soil will call for a free use of timber upon this portion of the line until the aid of the engine and gravel train can be obtained to form the permanent roadbed.

The limestone ridge which divides the "Great" and "Little" Cataragui rivers stretches from the toll gate to the "40 ft." road at an elevation of about one hundred feet above the harbor. It will therefore be necessary (in coming into Kingston) to run northward of the Bath road, until the macadamized road is crossed,—and sweep round toward the French Village to reach the terminus at the stone culvert on the Government lot. From this point the line can be extended down to the harbor, upon the Government lot, which offers the best facilities for such a purpose.

From the Little Cataragui the line, in order to avoid the rocky table land which stretches on the right bank of the Cataragui from Waterloo to "Collins Bay,"—keeps near the Bath road until it passes this bay, then bears up to cross McGuin's

creek above his mill pond, and passing south of Powley's saw mill it ascends the table land before reaching Mill Creek which it crosses a little below the Village. From Mill Creek, the line crosses the macadamized road about two miles west of the village, and keeping on the north side of this road until all the creeks are passed, it recrosses it between "Little Creek" and the toll gate, and passing round the Napanee hill, crosses the river above the dam.

Between Kingston and Mill Creek there are two expensive points on the line—viz: the crossing of the Little Cataraqui and the rocky ridge and swamp at Powley's Creek, but on either side of the line the route is worse; the most eligible ground is found upon the most direct route.

Napanee is the head of navigation, and the river is here passed without a drawbridge. To cross higher up would not only be more expensive, but add unnecessary length to the line.

From Napanee to Port Hope we are still upon a limestone formation, which however, only presents itself at a few points. The soil is sand and loam on the western half of this distance: on the eastern half for about two thirds it is clay. There are but three streams of note to be crossed in this distance of 70 miles;—the Salmon River, Moira, and Trent. The latter is the largest river upon the route.

The line passes through one of the streets of Napanee at an elevation of 85 feet above Lake Ontario, and about 40 feet above the stage road. It will pass between Shannonville and Smith's Mills (upon Salmon River), and enter Belleville upon the street which runs immediately north of the Court House,—thence crossing the town at an elevation of about 35 feet above Main street it goes out upon a corresponding street on the west side, and from this point it strikes directly to the Trent. This river is crossed at the foot of the Island, (opposite Myer's Mills) about three quarters of a mile above the present bridge. Ascending a ravine, the line strikes through a gravel ridge and crosses the York road about half-way between Trent and Brighton;—and passing a little south of Brighton, Colborne, and Grafton, it enters Cobourg (near the lake) by a straight line of upwards of twenty miles. By the removal of two or three ordinary build-

ings it will pass out of the town south of MacKeechie's woollen factory, and then run direct to Port Hope.

From Napanee to Port Hope abundance of gravel is everywhere in close proximity to the line. The soil upon two thirds of the route is of the most favorable description; a large portion of the route consists of free sand, and will not require ballasting.

At Belleville a line was sought both north and south of the town, either of which would have given bad grades and curves—and worse crossings of the streets and highways;—and would also have lengthened and increased the cost of the route. The direct route over the town was therefore preferred.

Two routes were run at Cobourg, one in the rear of Victoria College—which presents about equal advantages on the score of grades and cost,—but the consideration which leads me to prefer the front line is, that it does not cross the principal streets or either of the three leading toll roads which enter Cobourg from the north-east and west. Land damages will, however, have an important bearing upon the line here selected.

Napanee, Belleville and Port Hope, are the only other towns *through* which the line will pass, and at all of them it is elevated above the principal streets:—also, by taking the shore line at Cobourg nearly all the streets woul' terminate at the road. Thus in the passage of the towns, the line is fortunate—but in consequence of the extraordinary manner in which the front Townships from the Trent to Toronto have been surveyed, a very serious question with reference to road crossings must arise. Throughout this distance there is a "side line," or public road allowance every half-mile—exclusive of private and "forced" roads.

At Port Hope the line crosses the creek (at the head of the harbor) at an elevation of about 35 feet above Lake Ontario, and passing near the bank of the lake, keeps near the latter until it reaches the centre of Clarke. Here the ridge which extends from the "nine mile wood" to the east side of Bond Head (at Macpherson's) rises towards the lake, and the line is forced upon the York road at Clark's Tavern one and a half miles east of Newcastle.

From this point to the Rouge the direct route as governed by the lake was reluctantly abandoned. Between Bowmanville and

the town line of Whitby there is good ground, but this isolated section is inaccessible by any favorable route upon the line or south of the York road, either from the Rouge,—or from the York road east of Newcastle. Between Newcastle and Bowmanville and between Darlington and the Rouge, the country is “fluted” in a north and south direction. Broad-backed ridges, rising and widening gradually toward the front are separated by wide valleys,—and marshes but little above the elevation of the lake. These ridges and valleys run at right angles to the line required, and present a very unfavorable profile for a Railway.

My attention being directed by Mr. Samuel Green and Mr. Farewell of Whitby to an “ancient beach of Lake Ontario”—which was said to traverse the Townships east and west, I commenced an examination of a route northward of the York road. On going about two miles back from this road, the broken and undulating country of the front becomes gradually merged into a sandy and sometimes stoney plain, generally about one mile in width, and remarkably level. This plain is bounded *always* on its northern limits by a “gravel ridge” composed of water-worn limestone pebbles,—similar to those upon the present beach.

It has its characteristic head-lands and bays,—but the width of the plain admits of change of direction without objectionable curvature. This “beach” crosses the “York” road between Newton and Newcastle, and sweeping north-westward traverses Darlington, Whitby and Pickering from two to three miles north of that road and descends to it again at the Rouge. Here it follows the road to the hill at the English Church in Scarboro, where it bears away to the south, and is lost in the lake opposite “Gate’s Inn.” It re-appears again at the “Six Mile Inn” and the “Painted Post” and again bears north-westerly passing in rear of Toronto.

The line runs upon this formation nearly forty miles.

There can be little doubt that this is the corresponding formation to what is known on the south side of the lake as the “Ridge Road,” between Lockport and Rochester,—upon which the sixty mile level of the Erie Canal is placed.

	80	70	60
Tons.	Tons.	Tons.	Tons.
29	33	39	44
36	42	48	50
62	70	78	80
77	87	90	92
92	105	100	109
97	109	115	121
121	137	130	146
146	164	150	162
129	146	130	146
162	182	160	182
194	219	190	219

STATEMENT shewing the
the years 1840

At

Products

Pork—Salted and fresh.....

Do. do.

Beef do.

Do. do.

In its level surface, its sand and gravel, it presents a route for a Railway unsurpassed in this or any other country, but it also presents some formidable crossings of which the well known "Rouge" is the worst.

From the "Summit Inn" on the "York" Road, in Scarboro, the line passes in rear of the English Church, close to Highland Creek, and thence nearly direct to Dawes' Tavern, near the town line between York and Scarboro;—thence passing round the "Norway ridge" it descends to the Don near the Necropolis, and enters Toronto on Gerrard Street; passes through the town on the line of that street and comes down to the Queen's Wharf by the route of Garrison Creek, which it strikes at the Brewery on the West York Road.

This part of the harbor being open during the winter is the most suitable point for a Railway terminus.

Table of performance of Locomotives on different grades.

Kind of Engine.	Weight of Engine.	Maximum load on a level.	Velocity with maximum load per hour.	Maximum load at 20 miles per hour.	Gross maximum load on an ascent of							
					15 feet per mille.	25 feet per mille.	35 feet per mille.	40 feet per mille.	50 feet per mille.	60 feet per mille.	70 feet per mille.	80 feet per mille.
	Tons.	Tons.	Miles.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
B. For passengers, one pair of driving wheels	8 10 12	186 233 280	10 13 15	69 134 201	100 125 150	76 95 114	60 75 90	55 68 82	45 57 68	39 48 58	33 42 50	29 36 44
C. For passengers or freight, two pairs of driving wheels	12 15 18	373 466 560	12 13 14	177 267 364	202 253 304	154 192 236	123 154 184	111 139 167	94 117 140	80 100 120	70 87 105	62 77 92
D. For freight, three pairs of driving wheels	12 15 18	560 700 840	8 9 10	141 221 305	306 383 460	234 292 351	188 235 282	171 214 257	145 181 217	125 156 187	109 137 164	97 121 146
E. For freight, four pairs of driving wheels	16 20 24	746 933 1120	9 10 11	237 348 462	409 511 613	312 390 468	251 316 377	228 284 343	193 241 289	166 208 250	146 182 219	129 162 194

B.

Exports of Principal Articles of Produce from the Counties connected with the Toronto and Kingston Section of the Canada Trunk Railway, during the year 1850.
(Compiled from Official Trade Report.)

PORTS.	Ashes : Pot and Pearl.		Plank and Board.		Shingles.		Cows.		Horses.		Wool.		Wheat.		Flour.		Barley and Rye.		Beans and Peas.		Oats.		Butter.		Total Value.	
	Quantity - Barrels.	Value.	Quantity - M. Feet.	Value.	Quantity - Mills.	Value.	Number.	Value.	Number.	Value.	Quantity - Pounds.	Value.	Quantity - Bushels.	Value.	Quantity - Barrels.	Value.	Quantity - Bushels.	Value.	Quantity - Bushels.	Value.	Quantity - Bushels.	Value.	Quantity - Cwt.	Value.		
Bath	6	42	2616	5322	35	11							4571	856	1444	1291	10223	1043	2879	288	2124	106			8959	
Belleville	338	2366	10648	21296	92	23	1	4			9912	482	30686	6137	18756	18756	5604	360	3728	466			50	122	30012	
Bond Head			221	331									50144	9409			509	31	180	16	1675	84			9864	
Cobourg	28	140	1312	2410	59	20	41	173	29	610	68768	2475	310	70	5716	3836			448	50			‡	1	11789	
Colborne													2719	544												544
Credit			2430	3646									138063	25887	30000	30000									39533	
Darlington			936	1597	59	17							18042	3339	12141	11427	742	72	243	24					16476	
Grafton			878	1098	38	14	2	10									600	56							1178	
Hope	16	100	6027	9603	336	92			28	406	3654	135	47424	11725	7083	7685			514	65	141	9	180	450	30270	
Kingston	36	250	6149	10125			61	426	211	4220	30000	1900	216540	31226	22925	32528	3778	1266	6108	934	148	10	567	1394	75009	
Pictou			347	628	60	13							5907	1183	564	614	30000	425	543	68			6	17	2950	
Toronto	96	420	276	773	261	283	1	3			72000	4433	122321	28827	34348	34348	4501	537	2785	336	165951	8297	124	261	78538	
Whitby	386	1737	2537	5074	277	104	20	80	6	100			69000	12933	13500	13500			500	63	10000	500			34091	
Totals	906	5055	34377	61903	1237	579	136	696	274	5336	184331	9449	725737	132129	147079	146713	26757	3790	17908	3510	179139	9006	897	2245	379213	

62 Total value, 4379,213—1516,852—which it is believed is much below the real amount.

C.

STATEMENT shewing the progress of Agricultural Imports into the U. S. from Canada, by Inland Ports for the years 1840, 1845, 1849, and up to September 30th, 1850, distinguishing the articles.

ARTICLES	1840.		1845.		1849.		Three quarters of 1850.	
	Quantities.	Value.	Quantities.	Value.	Quantities.	Value.	Quantities.	Value.
Products of Agriculture.								
Pork—Salted and fresh.....pounds.....	553	\$ 27	...	\$	5940	\$	4656	\$
Do. do.barrels.....	...	...	...	...	44	658	87	802
Beef do.pounds.....	829	59	...	...	1620	...	5230	...
Do. do.barrels.....	...	...	...	...	4465	7115	806	2649
Butter	260	21	819	92	550856	43554	272610	29408
Wool	254	30	60843	5437	497539	46431	365151	51459
Hides and skins.....number.....	...	3850	1482	2409	98615	14671	86993	10253
Hams, shoulders and bacon.pounds.....	...	...	...	...	...	...	77071	2361
Eggs.....dozens.....	...	...	5240	234	90768	4487	176686	...
Poultry.....number.....	...	...	...	...	...	...	54	9391
Horses.....number.....	8	573	445	12806	4935	135577	4734	156804
Horned cattle.....number.....	...	...	110	1526	16285	53978	5391	51512
Flour of wheat.....barrels.....	1	4	5	14	221422	...	192039	...
Do. do.pounds.....	...	...	...	...	1000	...	4268	716390
Wheat.....bushels.....	286	268	135	125	830419	573179	647934	647934
Rye.....barrels.....	...	...	...	...	217	...	746	...
Do. do.bushels.....	...	...	7	3	22105	8696	49	1617
Barley—pearl and malt.....do.....	30	26	4301	1342	6822	3366	58898	23266
Oats and oatmeal.....do.....	73	57	69	52	327863	83883	445822	...
Do. do.barrels.....	19	...	11	...	1246	...	269	85048
Peas and beans.....bushels.....	...	...	33	16	74785	36650	30308	18379
Potatoes.....do.....	10	10	1564	219	9665	2886	12927	3079
Clover and grass seed.....do.....	307	307	6814	3511	22664	18167	19505	47855
Flax seed.....do.....	...	...	2244	1150	5017	3365	1631	2251
Total value in the years.....	1844—\$3,204	1845—28,936	1849—1,848,797	1850—1,860,636				